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The Comparison between the Effectiveness of Regular Flashcards and Digital Flashcards on Students' Vocabulary Mastery at Primary School

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ABSTRACT

Vocabulary mastery is fundamental to English language learning, particularly among primary school students who are developing their foundational language skills. This study aimed to determine whether a significant difference existed in vocabulary mastery between students taught using regular flashcards and those taught using digital flashcards. Quantitative approach with a quasi-experimental design was employed, involving 38 fifth-grade students at SD IT Wahdah Islamiyah 01 Makassar, Indonesia. The participants were divided equally into a control group and an experimental group, each comprising 19 students. The control group received instruction using regular flashcards, while the experimental group used digital flashcards. Data were collected through pre-tests and post-tests and analyzed using the Wilcoxon Signed-Rank Test and Mann–Whitney U Test. The results indicated improvements in vocabulary mastery in both groups. The experimental group's mean score increased from 81.21 to 94.32, whereas the control group's mean score increased from 80.11 to 93.95. However, the Mann–Whitney U Test yielded a significance value of 0.689 ($p > 0.05$), indicating no statistically significant difference between the two groups. These findings suggest that both regular and digital flashcards can support vocabulary learning among primary school students, although neither method demonstrated a statistically significant advantage over the other in this study. The findings provide practical insights for English teachers selecting vocabulary instructional media based on students' learning needs, classroom conditions, and available resources. This study contributes comparative evidence to the discussion of vocabulary instruction and highlights the potential of both traditional and technology-supported flashcards in primary English language learning.

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1. Introduction

Vocabulary is a fundamental component of English language learning because it supports students' ability to understand and communicate ideas through listening, speaking, reading, and writing (Daiu & Mihali, 2025; Istiqomah et al., 2023; Saha, 2020). Vocabulary mastery involves not only recognizing words but also understanding their meanings, pronunciation, forms, and appropriate use. For primary school students, developing vocabulary is particularly important because they are still building the linguistic foundation needed for further English learning. However, vocabulary learning remains challenging for many young learners, particularly in understanding word meanings, pronunciation, spelling, and remembering English vocabulary. Limited interest and engagement in vocabulary learning may also contribute to these difficulties (Ryan et al., 2024). Therefore, appropriate instructional media are needed to support vocabulary learning and maintain young learners' attention and participation.

One instructional medium widely used to facilitate vocabulary learning is flashcards. Regular flashcards provide students with words and visual representations that can be repeatedly presented during classroom activities. Their simple, affordable, and flexible characteristics make them suitable for primary school contexts. Previous studies have demonstrated their positive effects on vocabulary learning. Novasyari (2024) reported improvements in fifth-grade students' vocabulary mastery at SDN 05 Palembang, with 85% of students demonstrating better understanding after the intervention. Similarly, Feranty et al. (2024) found that the average vocabulary test scores of students at SDN 23 Pangkalpinang increased from 53.2 in the pre-test to 85.7 in the post-test. These findings suggest that regular flashcards provide an effective and practical medium for vocabulary instruction, particularly in classrooms where technological resources may be limited.

The development of educational technology has subsequently introduced digital flashcards as an alternative to regular flashcards. Digital flashcards provide additional features, including audio, images, quizzes, games, and other interactive elements, which may create more engaging opportunities for learners to recognize, practice, and retain new vocabulary. Aswita and Moetia (2025) found a strong positive correlation between Quizlet usage and vocabulary mastery among primary school students. Similarly, Anjarwati and Mahendra (2025) developed and validated digital flashcard media for fifth-grade students, reporting promising results in terms of effectiveness and student engagement. Other studies have also demonstrated the positive contributions of flashcards to vocabulary mastery and student engagement (Syamsiyah & Ma'rifatulloh, 2023), particularly through the interactive features of digital flashcards, which may enhance motivation and learning effectiveness (Karimi & Amiri, 2025).

Despite these advantages, regular and digital flashcards have different strengths and limitations. Digital flashcards offer interactivity, accessibility, and instant feedback but may require technological devices and adequate digital literacy. Conversely, regular flashcards are simple, cost-effective, and easy to implement in various classroom settings, although they may lack interactive features that enhance student motivation (Boroughani et al., 2023). Therefore, the selection of instructional media should consider their respective contributions to vocabulary learning and the characteristics of young learners. Furthermore, findings from adult learners may not be fully applicable to primary school students because of differences in cognitive development (Pinter, 2017).

Although previous studies have demonstrated the usefulness of both regular and digital flashcards, limited empirical evidence directly compares their effectiveness among primary

school students. Most previous studies have focused on examining only one type of flashcard rather than comparing both media directly, making it difficult to determine which is more effective for young learners. Therefore, this study aims to determine whether there is a significant difference in students' vocabulary mastery between those taught using regular flashcards and those taught using digital flashcards at the primary school level.

2. Theoretical Framework

2.1 Vocabulary and Vocabulary Mastery

Vocabulary can be defined as the collection of words and expressions that form a language system. Richards and Schmidt (2010) directly state that "the vocabulary of a language consists of its words and expressions" (p. 635). This definition highlights vocabulary not only as isolated words but as meaningful units used in communication. While Nation (2001) indirectly explains that vocabulary encompasses both form and meaning, emphasizing that learners must understand a word's spoken, written, and conceptual dimensions. This perspective shows that vocabulary is more than memorizing list of words.

Nation (2001) stated that vocabulary consist of two fundamental types: receptive and productive vocabulary. Receptive vocabulary is about recognizing and understanding words during reading and listening activities. Asyiah (2017) supports this view, stating that extensive reading activities significantly improve learners' receptive vocabulary. Students can comprehend meanings of words they encounter without necessarily being able to use them in speaking and writing.

On the other hand, productive vocabulary is about using words accurately and appropriately in speaking and writing. This requires a deeper level of language control and awareness of grammatical structure, collocations, and contexts. Productive vocabulary is often more challenging to acquire because it involves active retrieval and construction of words in meaningful communication. Nation (2001) also emphasizes that productive vocabulary includes knowledge of collocations, register, and grammatical usage. A study by Zuhairi and Mistar (2023) found that students who practiced writing and speaking regularly had higher levels of productive vocabulary mastery.

According to Nation (2001), vocabulary consists of three main dimensions: form, meaning, and use. The term form refers to the actual spoken or written manifestation of a word. It encompasses the pronunciation, spelling, and word parts representation of the word, making it identifiable in both speech and writing. Understanding the form of a word is crucial because it allows learners to recognize and reproduce the word accurately in communication. The term meaning refers to the understanding or sense of a word in language. It includes the basic meaning, which conveys the core idea of the word, as well as meanings that are related to other concepts or contexts. Words also carry associations, which are additional ideas or feelings that people connect with them. The term use refers to how a word functions in actual language contexts. It includes grammatical functions, which determine how a word fits into sentences and interacts with other words. Use also encompasses collocations, which are the typical combinations of words that frequently appear together.

Nurkhasanah et al. (2023) stated that vocabulary is when students have the ability to understand words, including aspects such as pronunciation and writing, and implies proficiency in both receptive and productive use. Vocabulary mastery refers to when learners not only recognize and understand words in receptive contexts (reading and listening), but also can produce and use them appropriately in productive contexts (speaking and writing) (Wulandari et al., 2026). Vocabulary mastery is an important aspect of language acquisition

that involves understanding, recalling, and using words accurately in various communicative contexts. Vocabulary mastery is more than only a word recognition; it requires knowledge of appropriate usage, pronunciation, and grammatical function. For English as a Foreign Language (EFL) learners, vocabulary mastery is foundational to developing the four language skills: listening, speaking, reading, and writing.

2.2 Flashcards

Flashcards are one of the most popular tools used in language learning, including English. Flashcards are great for presenting, practicing, and testing vocabulary with young learners (Dewi & Agustina, 2026). Regular flashcards, also known as paper flashcards, are cards that contain words and pictures. Flashcards are "a cardboard consisting of a word, a sentence, or a simple picture on it (Mohammadnejad et al., 2012; Nazira et al., 2025). These kinds of flashcards can be drawn or printed. This form of flashcard is not only easy to find, but it is also very affordable. We might even create them ourselves, depending on the creativity we have. These flashcards are useful for learning new vocabulary or concepts. They can be used by students of all ages. Regular flashcards are convenient and easy to carry around. They allow for repetitive practice, which helps improve memory retention. Overall, regular flashcards remain a popular and effective study tool.

Hidayat et al. (2025) stated that, as the technology is still developing, regular flashcards have been developed into digital flashcards in the form of an application or a website. Digital flashcards are defined as multimedia picture cards created with technology to support memorization and review of information, including vocabulary and terminology (Rahmawati & Dahlina, 2024). Digital flashcards are similar to regular or paper flashcards. However, this type of flashcard is digital-based, so we involve the use of technology in learning. As time goes by, there are many digital flashcard applications like this that we can access via handphone or computer, or laptop. This allows us to access them anywhere and anytime. Many apps also provide interactive features such as games and progress tracking. Users can easily create, edit, and organize flashcards without needing physical materials. Some digital flashcards include audio and video, which can enhance understanding, retention, and also students' motivation (Boroughani, et al., 2023). Overall, this modern approach makes studying more flexible and engaging for students.

2.3 Young Learners

Young learners are children who are still in the early stages of developing their cognitive, social, and language abilities. In the context of education, they typically refer to children in primary school, usually between the ages of 6 and 12 years old. At this stage, students are highly influenced by their environment and tend to learn through observation, imitation, and direct experience. Their attention spans are relatively short, so they require engaging and varied learning activities. As stated by Pinter (2017), young learners, especially in terms of cognitive development and learning styles.

Young learners tend to respond positively to learning activities that involve movement, games, songs, and visual materials. Cameron (2010) argues that young learners learn language more effectively when they are involved in meaningful and enjoyable activities. Teachers are encouraged to use concrete materials and interactive techniques to maintain students' attention and motivation. Flashcards are one example of visual media that can be used effectively with young learners because they combine images and words, helping students connect new vocabulary with visual representations. In addition. Young learners are more

likely to remember information when it is presented in a fun and repetitive way. According to Pinter (2017), repetition and meaningful interaction are essential for language development at the primary level. Therefore, instructional media such as regular and digital flashcards can be considered as appropriate tools for supporting vocabulary learning among young learners.

3. Method

3.1 Research Design

This study used a quantitative approach with a quasi-experimental design. The researcher chose a quantitative approach because the focus of this study was to measure and compare students' learning outcomes in the form of vocabulary mastery scores, which were analyzed statistically (Hyun et al., 2014). The quasi-experimental design that used in this study was a non-equivalent control group design, which involved two groups: an experimental group and control group. Both groups were given a pre-test before the treatment and a post-test after the treatment. The experimental group was given treatment using digital flashcards, while the control group was given regular flashcards.

Quasi-experimental design is a type of experimental design used when researchers do not have complete control over the random placement of research subjects, but still conduct interventions and measure the variables being studied (Creswell & Creswell, 2018). Therefore, the purpose of this study was to determine the difference in effectiveness between two types of flashcards in improving students' vocabulary mastery. The research design was described as follows.

Group	Pre-test	Treatment	Post-test
A	1	Digital Flashcards	2
B	1	Regular Flashcards	2

Note:
1: Pre-test (before treatment)
2: Post-test (after treatment)

3.2 Location

This study was conducted in SD IT Wahdah Islamiyah 01, Jl. Raya Bukit Baruga No. 12 B, Antang, Kecamatan Manggala, Kota Makassar. This research consisted of two research variables. There were independent variables and dependent variables as follows:

a. The independent variables of this research were regular flashcards and digital flashcards.
b. The dependent variable of this research was students' vocabulary mastery.

3.3 Population and Sampling

The population of this study was the 5th grade of primary school at SD IT Wahdah Islamiyah 01, academic year 2025-2026. It consisted of six classes, which were 5A1, 5A2, 5A3, 5B1, 5B2, and 5B3, with 138 students in total. The sample of this study used purposive sampling. The population was naturally divided into intact groups or clusters. From the 5th grade of SD IT Wahdah Islamiyah 01, academic year 2025-2026, two clusters were selected by the teacher as the sample of this study. To ensure both groups had equivalent initial ability, a pre-test was administered before the treatment. Next, the researcher gave the treatment using digital flashcards for one class and regular flashcards for the other class. After that, the researcher conducted a post-test and compared the students' vocabulary mastery after all of

the treatment. The study involved 38 students, consisting of 19 students in the experimental group and 19 students in the control group. The experimental group received treatment using digital flashcards, while the control group received treatment using regular flashcards.

3.4 Research Instrument

This research used a vocabulary test. There were a pre-test and post-test. The researcher provided written vocabulary tests for the pre-test and post-test, which consisted of vocabulary questions in the form of multiple-choice and fill-in-the-blank types of questions. The validity of the test was examined by an English Education lecturer before conducting the research. Finally, the researcher analyzed the data and compared the effectiveness of the two flashcards on students' vocabulary mastery based on the results of the pre-test and post-test.

3.5 Research Procedure and Data Collection

The data collection procedure consisted of three steps: pre-test, treatment, and post-test. First, the researcher administered a written vocabulary pre-test before the treatment to assess students' initial vocabulary mastery and ensure that both groups had equivalent levels of vocabulary knowledge. Second, the researcher implemented different treatments in each class over four meetings. The experimental group was taught using digital flashcards, while the control group was taught using regular flashcards. During each meeting, the teacher delivered English vocabulary materials based on the selected topics by explaining the pronunciation and meanings of words using flashcards. The students then participated in games or ice-breaking activities, followed by written exercises consisting of multiple-choice questions, word translation into English, and vocabulary use in simple contexts. Finally, the researcher administered a written vocabulary post-test after the treatment to measure students' vocabulary mastery and identify any changes following the instructional activities.

3.6 Data Analysis

The data of this research were analyzed using a quantitative method, as follows.

a. Scoring Students' Answers

The students' scores were calculated based on the number of correct answers obtained from the vocabulary test.

$$N = \frac{S}{Smax} x\ 100$$

N = Students' score
S = Total correct answers Smax = Total maximum score

b. Classifying Students' Scores

Interval	Predicate	Classification
88-100	A	Excellent
74-87	B	Good
60-73	C	Fair
<60	D	Poor

c. Statistical Analysis

The researcher analyzed the data using IBM SPSS 27 version. The statistical analysis was used to examine the improvement in vocabulary mastery within each group and

to determine whether there was a significant difference in students' vocabulary mastery between the experimental group and the control group after the treatment.

4. Results and Discussion

4.1 Students' Vocabulary Mastery Scores

The mean scores and standard deviation of students' vocabulary mastery in both the experimental and control groups before and after the treatment are presented below.

Table 1. Mean Score and Standard Deviation in Control Class an Experimental Class

Group	Pre-Test Mean	Post-Test Mean	Pre-Test Standard Deviation	Post-Test Standard Deviation
Experimental Group	81.32	94.32	11.672	6.430
Control Group	80.11	93.95	17.381	8.960

In the experimental group, the mean score increased from 81.32 in the pre-test to 94.32 in the post-test, indicating an improvement in students' vocabulary mastery after the treatment using digital flashcards. Similarly, the control group also showed an increase in mean score. The mean score rose from 80.11 in the pre-test to 93.95 in the post-test, indicating an improvement in students' vocabulary mastery after the treatment using regular flashcards. These results suggested that both groups experienced improvement in vocabulary mastery after the treatment.

Based on the standard deviation values, there was a decrease in score variation in both groups from pre-test to post-test. In the experimental group, the standard deviation decreased from 11.672 in the pre-test to 6.430 in the post-test, while the control group decreased from 17.381 in the pre-test to 8.960 in the post-test. These findings indicate that students' post-test scores became more consistent and showed less of a gap compared to pre-test scores.

4.2 Vocabulary Aspects

In this research, the researcher focuses on three aspects of vocabulary: Form, Meaning, and Use. The results for each assessed vocabulary aspect are presented below.

Table 2. Mean Score and Standard Deviation of Students in Each Assessed Vocabulary Aspect

Form				
Class	**Mean Score**		**Standard Deviation**	
	Pre-Test	Post-Test	Pre-Test	Post-Test
Experimental	8.68	9.74	2.083	.562
Control	8.21	9.68	1.843	.582
Meaning				
Class	**Mean Score**		**Standard Deviation**	
	Pre-Test	Post-Test	Pre-Test	Post-Test
Experimental	8.05	9.63	2.013	.597
Control	8.05	9.37	1.810	1.012

In the form aspect, the experimental group improved from 8.68 to 9.74, while the control group's mean score increased from 8.21 in the pre-test to 9.68 in the post-test. In the meaning

aspect, both groups also showed improvement, where the experimental group rose from 8.05 to 9.37. Similarly, in the use aspect, the experimental group improved from 7.74 to 9.00, while the control group's mean score increased from 7.84 to 9.21. These findings indicated that both groups achieved higher vocabulary mastery after the treatment. The greatest gain in the experimental group was found in the meaning aspect which increased by 1.58 points, while the control group obtained its greatest improvement in the form aspect, increasing by 1.47 points.

4.3 The Wilcoxon Signed-Rank Test

To examine the differences between the pre-test and post-test scores within each group, the Wilcoxon Signed-Rank Test was conducted.

Table 3. The Wilcoxon Signed Ranks Test in Both Groups

Variable	Negative Ranks (n)	Positive Ranks (n)	Ties (n)	Z	Sig. (2-tailed)	Interpretation
Experimental Group	0	16	3	-3.540	< .001	Significant improvement
Control Group	0	16	3	-3.525	< .001	Significant improvement

Table 3 above shows the results of the Wilcoxon Signed Ranks Test for both groups. In the experimental group, results showed that there were 0 negative ranks, indicating no students obtained lower scores on the post-test than on the pretest. Meanwhile, there were 16 Positive ranks, indicating that 16 students achieved higher scores on the post-test than on the pretest. In addition, 3 students had the same scores on both tests (ties). The Wilcoxon Signed Ranks Test yielded Z = - 3.540, with a significance value lower than 0.05, indicating that there was a statistically significant improvement in the vocabulary mastery of the students in the experimental group after receiving the treatment. In the control group, the findings indicate that there were 0 negative ranks, meaning that no students scored lower on the post-test than on the pre-test. There were 16 positive ranks, indicating that 16 students obtained higher post-test scores, while 3 students showed no change in their scores. The Wilcoxon Signed Rank test produced Z = -3.525 with a significance value of p< 0.001. Since the significance value was less than 0.05, it can be concluded that there was a statistically significant improvement in students' vocabulary mastery in the control group.

Table 4. The Effect Size of the Wilcoxon Signed Ranks Test

Group	N	Z	Asymp. Sig. (2-tailed)	Effect Size (r0	Interpretation
Experimental	19	-3.540	< 0.001	0.812	Large Effect
Control	19	-3.525	< 0.001	0.809	Large Effect

Table 4 presents the effect size of the Wilcoxon Signed Ranks Test for both the experimental and control groups. The experimental group consisted of 19 students and obtained a Z value of -3.540 with a significance value of p < .001. The calculated effect size was r = 0.812, which is categorized as a large effect. This indicates that the treatment had a substantial impact on improving the students' vocabulary mastery in the experimental group.

Similarly, the control group, which also consisted of 19 students, obtained a Z value of -3.525 with a significance value of $p < .001$. The effect size was $r = 0.809$, which is also categorized as a large effect. This finding indicates that the learning process in the control group also produced a substantial improvement in students' vocabulary mastery. Overall, both groups demonstrated large effect sizes, indicating that the improvements from the pre-test to the post-test were substantial in each group.

4.4 The Mann-Whitney U Test

To determine whether there was a significant difference in students' vocabulary mastery between the experimental group and control group after the treatment, a Mann-Whitney U Test was conducted. This non-parametric test was employed to compare the post-test scores of the two independent groups.

Table 5. The Result of Mann-Whitney U Test on Students' Vocabulary Mastery Scores

Groups	N	Mean Rank	Mann-Whitney U	Z	Sig. (2-tailed)	Description
Post-Test (Experimental Group	19	18.82	167.500	-0,400	0.689	There was no significant difference
Post-Test (Control Group)	19	20.18				

The mean rank of the experimental group was 18.82, while the control group was 20.18. However, the difference in mean rank between the two groups was very small (1.36), suggesting that the overall performance of both groups was relatively similar. The Mann-Whitney U value obtained was 167.500. The statistical test revealed a significance value (2-tailed) of 0.689, which was higher than the significance level of 0.05. Therefore, statistically, there was no significant difference in students' vocabulary mastery between those who were taught using digital flashcards and those who were taught using regular flashcards.

5. Discussion

The findings showed that both groups improved their vocabulary mastery after the treatments. The mean score of the experimental group increased from 81.32 to 94.32, while the control group improved from 80.11 to 93.95. These findings suggested that the use of flashcards, whether it was digital or printed, could be effective in improving students' vocabulary mastery.

The findings can be explained by the fact that both types of flashcards share similar characteristics. As stated by Mohammadnejad et al. (2012) regular flashcards provided visual representations of words through pictures and written forms, helping learners remember vocabulary more effectively. Likewise, digital flashcards offered similar functions while integrating technological features such as audio, games, and interactive activities (Rahmawati & Dahlina, 2024). Since both media presented vocabulary through visual and repeated exposure, students in both groups were able to improve their vocabulary mastery. These results aligned with Bland's (2019) research, who argued that flashcards were effective tools for presenting, practicing, and testing vocabulary with young learners.

Although both groups showed significant improvement, the Mann-Whitney U Test showed that there was no significant difference between the two groups. The significance value was 0.689, which was higher than the significance level of 0.05. Therefore, the null

hypothesis was accepted, indicating that there was no significant difference in students' vocabulary mastery between the experimental group and the control group after the treatments. In other words, there was no significant difference in effectiveness between the two types of flashcards; both of them were equally effective in supporting vocabulary learning among 5th-grade school students (Wulandari, 2025).

Both regular and digital flashcards provided colorful images and engaging learning opportunities that suited the needs of primary school students. As a result, students in both groups were motivated to participate actively during the learning process, which contributed to their vocabulary development. Furthermore, the effectiveness found in both groups was consistent with previous studies, which reported that flashcards positively contributed to vocabulary mastery. Syamsiyah and Ma'rifatulloh (2023) found that paper-based and digital flashcards improved vocabulary mastery and increased students' engagement in language learning. Similarly, this research revealed the effectiveness of flashcards in both groups.

These findings are also in line with Nation (2001), who explained that vocabulary mastery covers three interrelated dimensions, namely form, meaning, and use. The results showed that the experimental group, which was taught using digital flashcards, obtained its greatest improvement in the meaning aspect, increasing by 1.58 points, while the control group, which was taught using regular flashcards, obtained its greatest improvement in the form aspect, increasing by 1.47 points.

According to Rahmawati and Dahlina (2024), digital flashcards are multimedia picture cards that combine images, audio, and interactive features; these multimedia features likely helped students build stronger associations between words and their meanings, which explains the larger gain in the meaning aspect. On the other hand, regular flashcards as cards consisting of a word, a sentence, or a simple picture that students repeatedly see in printed form (Mohammadnejad et al., 2012); this repeated visual exposure to the written word is likely why the control group showed its strongest improvement in the form aspect.

The large effect sizes obtained from the Wilcoxon Signed Ranks Test also support the vocabulary mastery theory presented in the previous study. Nurkhasanah et al. (2023) defined vocabulary mastery as the ability to understand words, including aspects such as pronunciation and writing, and as proficiency in both receptive and productive use. Wulandari et al. (2026) further explained that vocabulary mastery means learners can recognize and understand words in receptive contexts and can also produce and use them appropriately in productive contexts.

The effect sizes of r = 0.812 in the experimental group and r = 0.809 in the control group, both categorized as large effects, indicate that the improvement produced by both regular and digital flashcards was substantial rather than incidental. This supports the theoretical view that vocabulary mastery develops through repeated, meaningful exposure to words, since both types of flashcards, despite differing in medium, provided this kind of repeated exposure to the target vocabulary.

Overall, the findings indicate that both regular flashcards and digital flashcards were equally effective in improving students' vocabulary mastery at primary school level. These findings suggested that the use of flashcards, whether it was digital or printed, could be effective in improving students' vocabulary mastery.

6. Conclusion

It can be concluded that both groups showed effectiveness by revealing improvement in vocabulary mastery after the treatments. The experimental group's mean score increased from

81.32 in the pre-test to 94.32 in the post-test, while the control group's mean score improved from 80.11 to 93.95. These results indicate that both regular and digital flashcards were effective in improving students' vocabulary mastery. These results are also statistically supported; a Wilcoxon test was conducted on each group, and the results showed an increase in vocabulary mastery among 5th grade students. All significance values for each group were below 0.05, indicating that there were statistically significant differences in both groups.

The statistical analysis using the Mann-Whitney U test was also conducted to determine whether there was a significant difference in vocabulary mastery between the experimental group and the control group. The result showed a significance value of 0.689, which was higher than the significance level of 0.05. Therefore, the null hypothesis (H0) was accepted, and the alternative hypothesis (H1) was rejected, indicating that there was no significant difference between the vocabulary mastery of students taught using regular flashcards and those taught using digital flashcards. Although the experimental group obtained a slightly higher post-test mean score, the difference was not statistically significant. These findings suggested that both types of flashcards were equally effective for vocabulary learning among young learners. In addition, both regular flashcards and digital flashcards effectively supported students in learning vocabulary aspects, including form, meaning, and use. Therefore, teachers may utilize either regular or digital flashcards according to classroom conditions, technological availability, and students' learning needs. It is important to note that the findings of this study should be interpreted as representing the short-term effects of the treatment rather than long-term vocabulary retention. This was due to the school's academic schedule, as the students were preparing for their final examinations. Consequently, the researcher only granted permission to conduct the research over four meetings.

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Conflict of Interest
There is no conflict of interest.

Authors' Contribution
Aisyah Ariyani Nurfatikah: Conceptualization, Data curation, Formal analysis, Funding acquisition, Writing – original draft, Writing – review & editing
Muhammad Miftah Fauzan: Methodology, Supervision, Writing – review & editing
Ahmad Talib: Methodology, Supervision, Writing – review & editing

Statement of the Use of AI
The authors declare that, during the process of writing this paper, they used generative AI to refine the grammar, readability, and language; however, all research outputs and content were

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